211

TECTONIC AND STRATIGRAPHIC FRAMEWORK FOR DRILLING IN THE SOUTHWESTERN ROSS SEA: CONSTRAINTS FROM NEW SEISMIC REFLECTION PROFILES

T. Wilson[1], S. Henrys[2], J. Hall[1], J. Whittaker[2], C. Fielding[3]

[1]Ohio State University, Columbus, Ohio, United States, [2]Institute of Geological and Nuclear Sciences, Wellington, New Zealand, [3]University of Nebraska, Lincoln, Nebraska, United States

The western Ross Sea, Antarctica, is underlain by the Victoria Land rift basin and the superimposed Terror Rift. Intraplate extension and transtension associated with regional strike-slip deformation have both been proposed for the Terror Rift by previous workers. Marine seismic data across the Terror Rift, western Ross Sea, Antarctica, is revealing new details of neotectonic rift geometry and relative timing of rift phases.

During the austral summer of 2004 the RVIB Nathanial B Palmer (NBP0401) collected 2000 km of multi-channel and 500 km of single-channel seismic data over the Terror Rift. We have combined this extensive new data set with seismic profiles acquired by earlier U.S. and Italian surveys to better define regional rift basin architecture. Key reflectors that can be traced regionally throughout the western Ross Sea have been identified, mapped and, where possible, integrated with age data from Cape Roberts (CRP) and CIROS drillholes.

The seismic data reveal a sedimentary succession which overlies the strata sampled by CRP drillholes, dating it as younger than 17 Ma (post-Middle Miocene) in age, that reaches up to 2.5 s (at least 3500 m thickness). In McMurdo Sound, the units have a regional eastward dip from the western shelf and project beneath Ross Island. Unconformity-bounded sedimentary packages within the succession thicken and thin across faults, indicating syntectonic deposition. A major angular unconformity truncates prominent faulting; younger faults cut this unconformity and reach the modern seafloor. Late Cenozoic volcanic rocks associated with emergent and seafloor volcanoes are associated with these stratigraphic units and follow prominent rift fault zones. The Terror Rift fault arrays project beneath Ross Island and can be inferred southward beneath the Ross Ice Shelf. The upcoming ANDRILL project drillholes will sample these young stratigraphic units beneath the McMurdo Ice Shelf and Southern McMurdo Sound, providing new age control for neotectonic rift evolution in the region.